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MRO 360°

Approaching Retirement Age

Maintenance Management of Aged Aircraft Engines

3-D Printing
Helping to Transform MRO

Availability is Crucial
Simplifying the Procurement Process

Component MRO
From Reactive to Predictive Practices

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Dear Colleagues,

Welcome to the new year. I wish all readers good health and success in 2025.

In this edition, we address the topic of 'maintenance of older engines'. When engine types approach the end of their service life, several new possibilities for cost reduction arise. In particular, material costs can be significantly reduced through the adoption of used serviceable material. As more engines are retired, the greater the supply of used material. We spoke with several companies who shared with us what they feel should be taken into account when maintaining older engines.

We also spoke with Tony Kondo, President & CEO, Werner Aero and Mike DeMicco, Senior Vice President Sales & Material Management, VAS Aero Services about the topic of procurement and material availability.

I hope you enjoy reading this issue.

Peter Jorssen
Publisher


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MRO 360°

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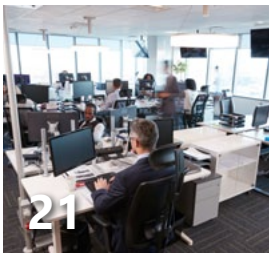
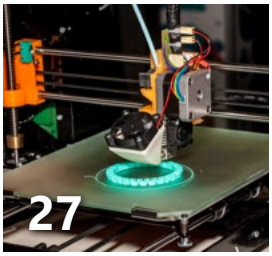
Maintenance Management of Aged Aircraft Engines





SriLankan Airlines orders FSG's new EFB provision solution

FSG will equip SriLankan A330/A320 aircraft with its new EFB provision solution
© Fokker Services Group

Fokker Services Group (FSG) has secured an order from SriLankan Airlines to equip its entire fleet of Airbus A320s and A330s with a newly designed Electronic Flight Bag (EFB) provision solution. The solution includes a pivot mount, USB-C outlet and a DC-DC converter. With this order, SriLankan Airlines becomes the launch customer for FSG's upgraded EFB Provision Solution for A320 and A330 aircraft, featuring a USB-C charging solution. This move highlights the airline's commitment to modernising its fleet and adopting the latest technological advancements in aircraft operations. As part of its ongoing fleet enhancement strategy, SriLankan Airlines is phasing out its existing devices and migrating to the latest iPad® models. The new iPads® offer larger dimensions and increased power ratings, making them an ideal choice. This upgrade ensures minimal installation time and adheres to the highest safety standards. FSG's new EFB Provision Solution upgrades SriLankan Airlines' existing spider mount to the pivot mount system. This streamlined solution allows the airline to securely hold the latest generation of iPads® (up to 11 inches), providing greater flexibility, improved user experience, and enhanced durability. Furthermore, the USB-C power solution replaces the previously installed USB-A outlet in the cockpit, ensuring the integration of the latest technology and preparing the cockpit for future device upgrades.

AerSale acquires aircraft parts portfolio from Sanad Group

AerSale is expanding its inventory with key aircraft components from Sanad Group *© Shutterstock*

AerSale has acquired a portfolio of aircraft parts from the Sanad Group, an aerospace engineering and leasing solutions provider wholly owned by Abu Dhabi's sovereign investor, Mubadala Investment Company (Mubadala). The portfolio comprises high-demand components for widely operated aircraft models, including the 737NG, A320 family, A330/340, Boeing 777, Embraer E-Jet and various quick engine change (QEC) kits. Notably, the inventory features an overhauled A330 enhanced landing gear shipset with exceptional traceability, ensuring seamless support for AerSale's customer requirements.

This strategic transaction enhances AerSale's capacity to meet the growing demands of its global customer base while supporting Sanad's strategy of cultivating industry partnerships and optimising its diversified component portfolio for sustained growth. The partnership between AerSale and Sanad demonstrates a shared commitment to leveraging complementary expertise and expanding their global presence. The acquisition of this inventory strengthens AerSale's ability to serve an increasingly diverse customer base by broadening its range of top-quality parts for widely operated aircraft. Furthermore, the agreement bolsters MRO synergies between AerSale and Sanad. This collaboration enables both organisations to address evolving customer requirements and deliver innovative solutions for the aviation industry. By harnessing their shared expertise and strengths, AerSale and Sanad are well-positioned to achieve their joint objectives and deliver exceptional value to their customers worldwide.

TP Aerospace and Maldivian extend partnership

TP Aerospace and Maldivian have expanded their partnership © *TP Aerospace*

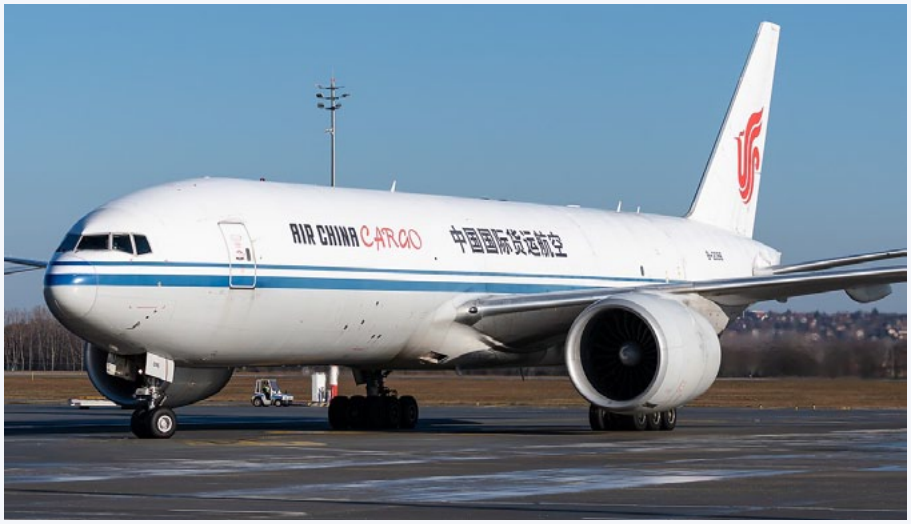
TP Aerospace has extended its long-standing partnership with Maldivian, the national airline of the Maldives, by implementing a comprehensive cycle flat rate (CFR) programme. This full-service, all-inclusive solution will support Maldivian's newly acquired A330 wide-body fleet, further strengthening the relationship between the two companies. Maldivian has been a valued customer of TP Aerospace since 2015, initially utilising the wheel flat rate (WFR) programme to maintain its fleet of narrow-body aircraft. The recent addition of wide-body aircraft marks a significant milestone for the airline, and TP Aerospace's CFR programme will play a key role in supporting this new phase of growth. As the Maldives' leading domestic airline, Maldivian operates a combination of seaplane and wheel-based flights from its main hub at Velana International Airport. The carrier offers frequent daily services to 16 domestic airports and provides air transfers to resorts throughout the Maldives. In addition, Maldivian operates international routes to India and Bangladesh, enhancing its reach in the region. The expanded partnership with TP Aerospace highlights Maldivian's commitment to maintaining operational excellence and ensuring the reliability of its growing fleet. By adopting the plug-and-play CFR programme, the airline benefits from a streamlined approach to fleet maintenance, enabling it to focus on delivering quality services to its passengers.

thyssenkrupp Aerospace secures aluminium supply from Novelis

thyssenkrupp Aerospace, the supply chain management and third-party logistics service provider for the commercial aerospace industry, and Novelis, a sustainable aluminium solutions provider and a front runner in aluminium rolling and recycling, have renewed their strategic partnership through a multi-year agreement. Under the agreement, Novelis will supply specialised, aerospace-grade aluminium from its facilities in Koblenz, Germany and Zhenjiang, China, to several thyssenkrupp Aerospace key markets in Europe and Asia. The contract ensures the continued supply of premium, aircraft-grade aluminium plates and sheets from Novelis to thyssenkrupp Aerospace, reaffirming Novelis' strategic importance as a supplier of innovative aluminium products for the aerospace sector. Patrick Marous, CEO of Business Unit Solutions at thyssenkrupp Materials Services and responsible for the Aerospace business field, commented: "We are very pleased that our global Aerospace unit is prolonging our partnership with Novelis. Securing a reliable, long-term supply of high-quality aluminium is critical to ensuring that we can consistently meet the needs of our customers. This agreement reinforces our commitment to delivering excellence by ensuring material availability and reliability for our customers' supply chains, an important part of our 'Materials as a Service' strategy. We look forward to continuing this successful collaboration." "Since the first contract was signed in 2014, our collaboration with thyssenkrupp Aerospace has flourished," highlighted Johan Petry, Vice President Sales & Marketing, Global Aerospace, at Novelis. "We look forward to building on this successful relationship, underlining Novelis' role as a preferred supplier and continuing to deliver high-quality products that meet the evolving needs of the aerospace industry." This long-standing collaboration marks a significant step in maintaining the well-established relationship between Novelis and thyssenkrupp Aerospace. It strengthens the position of both companies in the global aerospace market and reflects their ongoing commitment to innovation and the provision of high-performance materials to the aerospace industry on a global scale.

Patrick Marous, CEO Business Unit Solutions at thyssenkrupp Materials Services (l) and Johan Petry, VP Sales & Marketing, Global Aerospace Novelis Europe (r) © Novelis

AFI KLM E&M extends maintenance contract with Air China Cargo



AFI KLM E&M and Air China Cargo have extended the PBH contract *© AirTeamImages*

Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) has announced an extension to its power-by-the-hour (PBH) contract with Air China Cargo Co., Ltd., reinforcing a partnership that began in 2015. The extension secures support for new aircraft joining the Air China Cargo fleet, advancing their long-standing collaboration. The revised agreement expands the scope of the contract to include additional Boeing 777F aircraft equipped with GE90-110B engines. This development reflects the enduring strength of the partnership, built on mutual trust and a shared commitment to operational excellence. Air China Cargo, renowned for its high standards in global cargo transportation, reaffirms its dedication to maintaining a modern and efficient fleet through this agreement. The extension highlights their focus on meeting the growing demands of international air cargo with enhanced reliability and performance.

Liebherr Aerospace Brasil to expand operations with €45m investment

Liebherr has announced plans to expand the production facilities of its aerospace division in Guaratinguetá, Brasil (Liebherr Aerospace Brasil), by 8,000 square metres. The new site, expected to be operational within two years of construction commencement, represents a €45 million investment over the next decade. This expansion is set to create hundreds of new jobs, providing a significant boost to the local economy. The ceremonial ground breaking is scheduled for next month, with production ramp-up anticipated to begin in 2026. The expanded facility will specialise in machining and surface treatment of high-precision aluminium and steel aircraft components. Additionally, it will enable the transfer of work from Liebherr-Aerospace's European manufacturing sites in Lindenberg, Germany, and Toulouse, France, enhancing the company's global production capabilities. Rogério Gimenez, Managing Director at Liebherr Aerospace Brasil, said: "We are very happy and looking forward to extending our already well-established aerospace activities in Guaratinguetá. The new building will help us to cope with the steep production ramp-up currently experienced by the aerospace industry and to strengthen our long-term competitiveness." The decision to expand in Guaratinguetá was influenced by strong support from local and state authorities. The Mayoralty of Guaratinguetá and the São Paulo State Government played pivotal roles, particularly regarding a competitive taxation framework. Since 2005, Liebherr Aerospace Brasil produces critical high-tech components for flight control and actuation systems, environmental control and thermal management systems, landing gear systems, as well as for aircraft engines.

Liebherr has decided to expand the production facilities of its aerospace division in Guaratinguetá, Brasil © *Liebherr*

EFW welcomes Qantas A380 for maintenance work

Elbe Flugzeugwerke GmbH (EFW) has announced the arrival of a Qantas Airbus A380 in Dresden on January 14. The aircraft is arriving for maintenance work (MRO), an area in which EFW is one of the few global experts. The A380 will be flown by a crew of four pilots, accompanied by additional crew members, travelling from Sydney via Singapore to Dresden. This aircraft is familiar to the EFW team, having undergone maintenance and a comprehensive cabin renovation in Dresden in 2020. Once the current maintenance tasks are completed, the A380 will leave EFW's hangars in a few weeks. Qantas is scheduled to bring several A380s to Dresden for maintenance throughout the first half of the year. The A380 has seen a resurgence on international routes, with many airlines re-introducing it to their fleets, creating increased demand for maintenance services. EFW resumed MRO for A380s last year after a hiatus, starting with a Global Airlines A380 in autumn 2024 for a heavy maintenance event. The successful completion of that project ensured the airworthiness of the aircraft, enabling its return to regular operations. Over the years, EFW has serviced more than 50 Airbus A380s in Dresden. Alongside its maintenance division, EFW also specialises in converting passenger aircraft into freighters (P2F) and oversees conversion sites across three continents.

The Qantas A380 arrived on January 14, in Dresden for maintenance work © *EFW*

Austrian Airlines introduces AeroSHARK technology on Boeing 777-200ER

Installation of AeroSHARK on Austrian Airlines' Boeing 777 © *Lufthansa Technik*

Austrian Airlines has successfully launched its first Boeing 777-200ER, equipped with AeroSHARK surface technology, on its maiden flight. The aircraft, registered as OE-LPC, departed Bangkok International Airport and arrived in Vienna under flight number OS26. This achievement follows the European Union Aviation Safety Agency's (EASA) approval of AeroSHARK for the Boeing 777-200ER, enabling Austrian Airlines to lead the adoption of this ground-breaking technology on this aircraft type. Developed collaboratively by Lufthansa Technik and BASF, AeroSHARK is a surface film that mimics the microstructure of sharkskin to optimise airflow over the aircraft fuselage and engine nacelles. This innovative technology improves fuel efficiency by approximately one percent, resulting in significant reductions in CO2 emissions. For Austrian Airlines, AeroSHARK aligns with its sustainability strategy, which prioritises reducing environmental impacts in flight operations. The modification of Austrian Airlines' Boeing 777-200ER fleet is progressing, with four of six aircraft expected to be equipped with AeroSHARK by March 2025. The installation was seamlessly integrated into a scheduled maintenance visit, ensuring minimal disruption to operations. Austrian Airlines is the first carrier to apply this technology to the Boeing 777-200ER, supported by Lufthansa Technik's extended Supplemental Type Certificate (STC) from EASA. Austrian Airlines projects that by 2028, the AeroSHARK-equipped Boeing 777-200ERs will save around 2,650 metric tonnes of kerosene, reducing CO2 emissions by approximately 8,300 metric tonnes. This reduction equates to roughly 46 direct flights between Vienna and New York. AeroSHARK's success builds on its deployment across other Lufthansa Group fleets and beyond, with 22 modified Boeing 777 aircraft currently in operation across six airlines. Lufthansa Technik and BASF are committed to expanding the application of AeroSHARK to additional aircraft types and larger surface areas, further advancing sustainable aviation.

Muirhead launches integrated seat cover service for airlines

Muirhead has announced a strategic expansion into the global seat cover business
© *Muirhead*

Muirhead has announced a strategic move into the global seat cover market, offering a unique, vertically integrated service that disrupts traditional airline seating supply chains. Renowned for its sustainable leather production, Muirhead is now a fully certified provider of streamlined, end-to-end seat cover solutions for airlines and seat OEMs. The new Muirhead seat cover service encompasses every stage of production, from initial design and fit checks to certification, material production, and seat cover manufacturing. By eliminating the need for multiple suppliers, the service reduces complexity, lead times, and costs while enhancing quality control and accountability. Nicholas Muirhead, CEO of Scottish Leather Group, the parent company of Muirhead, remarked: "This marks a significant milestone for Muirhead. Our entry into the seat cover market builds on over a century of leather expertise and we're bringing that same commitment to quality and innovation to a new frontier. By integrating every stage of the seat cover production process, we're offering airlines a seamless service that ensures absolute accountability and delivers superior value." Martin Longden, Head of Cabin Engineering at Muirhead, added: "Unlike fabrics or synthetics, leather demands specialised craftsmanship and technical expertise to achieve the fit and performance required in aviation – expertise often missing in traditional supply chains. At Muirhead, we've integrated every step of this process under one roof, ensuring airlines benefit from a seamless, accountable solution and the unrivalled quality that only comes from working with a dedicated leather specialist." The vertically integrated approach eliminates intermediary stages, reducing margin stacking and ensuring traceability from farm to fit. Muirhead's expertise ensures leather seat covers meet the highest standards of durability and performance, with faster turnaround times and competitive pricing. Sustainability remains a cornerstone of Muirhead's operations. The company's patented circular manufacturing processes and zero-waste commitment align with airlines' environmental goals, supported by a seven-year leather warranty and independently verified life cycle analysis.

StandardAero receives CAAC approval for LEAP MRO in China

LEAP-1A engine © *StandardAero*

StandardAero's Texas engine overhaul centre has received maintenance organisation approval from the Civil Aviation Administration of China (CAAC) for the CFM International LEAP-1A and LEAP-1B turbofan engines. This approval allows StandardAero to meet the maintenance, repair, and overhaul (MRO) requirements of operators in China, where more than 1,200 LEAP-1A and LEAP-1B engines are currently in service, powering Airbus A320neo-family and Boeing 737 MAX aircraft. Janice Ho, Airline Sales Director (ASD) for the Asia-Pacific region for StandardAero's Engine Services – Airlines & Fleets division, commented "As a trusted provider of engine and APU MRO services to airlines and asset owners throughout China, StandardAero looks forward to meeting the LEAP-1A and LEAP-1B needs of Airbus A320neo and Boeing 737 MAX operators across the nation. Our LEAP Customer Advisory Board (CAB) already incorporates Chinese representation, to ensure that we anticipate the needs of Chinese LEAP customers, and our local team of sales and service experts is now fully engaged with the 20-plus airlines operating the LEAP-1A and LEAP-1B across China." In addition to developing MRO capabilities for the LEAP-1A and LEAP-1B engines at its San Antonio facility, StandardAero is also expanding its engine component repair services for the LEAP family through its Component Repair Services (CRS) network and Repair Development Centre of Excellence. To date, the CRS team has industrialised over 260 component repairs for the LEAP-1A and LEAP-1B engines.

AerFin opens new headquarters in South Wales

AerFin has opened its new global headquarters in South Wales *© AerFin*

AerFin, an aviation asset specialist, has announced the relocation to its new global headquarters in Newport, South Wales, the UK, marking a pivotal moment in its global expansion journey. The move, effective January 2025, underscores AerFin's commitment to supporting local employment while addressing the evolving needs of the global aviation industry. The 116,000 ft² facility at Indurent Park has been custom designed to enhance operational efficiency, encourage collaboration, and provide an inspiring environment for employees and customers alike. AerFin CEO Simon Goodson highlighted the significance of this milestone: "Our new headquarters in South Wales marks a significant step in AerFin's growth journey. It reinforces what our customers, partners, suppliers and investors value about our capabilities to deliver confidently, reliably and progressively for them across a global footprint that includes key facilities in Miami, Singapore, Dublin and London Gatwick. Indurent Park will be a cornerstone of our growth, enabling us to meet the needs of a global customer base while maintaining strong roots in South Wales." The expanded headquarters will double AerFin's engine MRO (maintenance, repair, and overhaul) capacity, allowing up to 200 quick turn shop visits annually. Advanced warehouse automation, cutting-edge diagnostics, and eco-friendly processes will ensure faster turnarounds, greater efficiency, and bespoke solutions for airlines, lessors, and MROs worldwide. Reflecting AerFin's dedication to sustainability and innovation, the facility is equipped with features such as EV chargers, advanced diagnostics tools, and environmentally conscious operational practices. Designed with employee wellbeing as a priority, the new headquarters offers over 13,600 ft² of contemporary office space, state-of-the-art meeting rooms, and 125 parking spaces, including 20 EV charging points.

Daher inaugurates Fly'in technology centre

Daher has officially inaugurated its new technology centre, Fly'in, which is dedicated to sustainable aviation. Situated at the Tarbes-Lourdes-Pyrénées Airport in southwestern France, this 2,100 m² centre of excellence underscores Daher's commitment to environmentally friendly aviation and represents a pivotal step in the sustainable transformation of the aerospace sector. With the opening of Fly'in at Tarbes, Daher completes its trio of technology centres in France, each focusing on a distinct strategic expertise. These include the Log'in facility in Toulouse, specialising in industrial logistics, and Shap'in in Nantes, dedicated to advanced aerostructures. Together, these platforms embody Daher's mission to address future technological and environmental challenges. These initiatives are supported by the French government and the European Union under the France 2030 programme, as well as by the Occitanie and Pays de la Loire regions. They form a core component of the Daher Group's "Take Off 2027" strategic plan. Fly'in is equipped with cutting-edge infrastructure designed for research, development, rapid prototyping, ground and flight testing, and data science. Among its flagship projects is the EcoPulse aircraft demonstrator, which allows Daher and its partners, Safran and Airbus, to explore high-voltage electric hybridisation technologies aimed at reducing aircraft carbon emissions. One of Fly'in's primary objectives is to bolster the economic and industrial appeal of the region by fostering robust partnerships with academic, industrial, and institutional stakeholders. In addition to driving technological innovation, the centre will support the development of skills and future professions essential for the aerospace industry. Fly'in is integral to the Campus Aero Adour project, which aims to offer attractive training programmes and qualifications. The project targets the training of 15,000 individuals and aims to raise awareness among 36,000 people about the challenges facing the aerospace sector by 2030. As a unique site in France, Fly'in will not only advance Daher's aerospace activities but also facilitate the development of eco-friendly technologies. With expertise in rapid prototyping, advanced engineering, artificial intelligence, structural testing, and embedded systems testing, Fly'in reinforces Daher's position as a global leader in sustainable aviation.

DAE signs agreement to acquire NAC

DAE has agreed to acquire 100% of Nordic Aviation Capital *© Embraer*

Dubai Aerospace Enterprise (DAE) has announced the signing of a definitive agreement to acquire 100% of the Nordic Aviation Capital group (NAC), an aircraft leasing company established over 30 years ago. Financial terms of the transaction were not disclosed. As of September 2024, NAC's fleet consisted of 252 owned and committed assets leased to around 60 airline customers in approximately 40 countries. Pro forma, DAE Capital's fleet will total about 750 owned, managed and committed aircraft, valued at approximately US$22 billion, leased to around 170 airline customers in roughly 70 countries. Firoz Tarapore, Chief Executive Officer of DAE, commented, "We are delighted at this opportunity to add NAC's capabilities, complimentary market presence and people to our platform. This transaction will allow us to provide more cost-effective solutions to a larger group of customers." The transaction will be appropriately capitalized and funded by internal resources and committed debt financing. Consequently, DAE's leverage, and funding metrics will remain comfortably within the levels consistent with DAE's credit ratings. The transaction is subject to required regulatory approvals and approval of the shareholders of NAC Holdings Limited and is expected to be completed in the first half of 2025. DAE was advised by Allen Overy Shearman Sterling LLP and KPMG.

GA Telesis to acquire AAR's landing gear overhaul business

GA Telesis has announced the signing of a definitive agreement to acquire AAR's landing gear overhaul business and wheels and brakes business unit. Upon completion, the acquired operations will be integrated into the GA Telesis MRO Services Division under Group President Pastor Lopez and rebranded as GA Telesis Landing Gear Services. This acquisition will enhance GA Telesis' expertise in overhauling landing gear systems for commercial and military aircraft, including Airbus, Boeing, Bombardier, and Embraer platforms. The addition of specialised wheel and brake repair services will further bolster the company's capabilities within the aviation sector. The deal will also introduce High-Velocity Oxy-Fuel (HVOF) coating capabilities to GA Telesis' portfolio, enabling advanced surface treatments that improve the longevity and durability of critical aircraft components. These advancements align with GA Telesis' mission to deliver innovative aftermarket solutions for the aviation industry. Abdol Moabery, President and CEO of GA Telesis, expressed enthusiasm about the expansion of the company's services, emphasising its commitment to delivering greater value to aviation partners. "This acquisition allows us to grow the GA Telesis Ecosystem™ and continue providing innovative solutions to our customers worldwide." The transaction requires regulatory approvals, including a CFIUS review, and is expected to close in early 2025.

Dynamatic Technologies and Aequs strengthen partnership for Airbus A220 door programme

Dynamatic Technologies and Aequs Private Limited (Aequs) have signed a contract to supply complex structural components for Airbus' A220 door programme. Under this five-year agreement, awarded by Dynamatic Technologies, Aequs will leverage its comprehensive capabilities to manufacture and deliver over 200 detailed parts. These parts involve advanced tool design, forgings, machining, and surface treatment, underscoring the complexity and precision required for the project. The partnership enhances the strategic relationship between these two key players in the global aerospace supply chain. By collaborating on this programme, both companies aim to contribute to the increasing global presence and maturity of India's aerospace manufacturing ecosystem. This partnership also reinforces India's 'Make in India' vision, with Airbus contracting Dynamatic Technologies earlier this year for one of the largest aerospace export orders to Indian companies. Dynamatic is responsible for manufacturing and assembling A220 Family aircraft doors, further cementing India's place in the global aerospace industry.

Teesside Airport boosted by Willis and Jet2 partnership

Willis Aviation Services Limited (WASL, Willis) has entered into a long-term agreement with leisure airline Jet2.com to conduct in-depth "C-Checks" on its fleet of 737 aircraft at WASL's Teesside base. This agreement marks another milestone in the ongoing development of Teesside Airport Business Park. The announcement follows a period of expansion for the airport, including the establishment of Airbourne Colours, a premier aircraft painting firm. Operating from a newly built 27,000 ft², facility north of the runway, Airbourne Colours has already painted Jet2 aircraft. Meanwhile, WASL's Jet Centre at Teesside provides a full spectrum of ground handling services for private, business, military and cargo aviation. Additionally, the company operates from Hangar 2, supporting maintenance, storage and aircraft disassembly. Plans for further growth are already in place, as WASL has secured planning permission to expand its MRO operations at Teesside.

Avolon completes acquisition of Castlelake Aviation

Avolon, the aviation finance company, has successfully completed its acquisition of Castlelake Aviation from Castlelake L.P.'s aviation platform. The transaction, which was first disclosed on September 13, 2024, includes a substantial portfolio comprising 106 aircraft currently on lease, as well as commitments for ten new-technology aircraft. This strategic acquisition significantly enhances Avolon's already impressive fleet, raising the total number of aircraft in its portfolio to 1,129. This includes 664 aircraft owned and managed by Avolon, with an additional 465 new-technology aircraft commitments. Clifford Chance and KPMG advised Avolon on the transaction, ensuring the process was executed efficiently and in line with the company's long-term objectives. The addition of Castlelake Aviation's assets to Avolon's fleet strengthens the company's position as one of the largest and most diversified aircraft leasing firms, with a robust portfolio that continues to evolve to meet the demands of a rapidly changing aviation market.

TRAC acquired by India's PTC Industries

Rcapital has announced the sale of Trac Precision Solutions (TRAC), a UK-based provider of precision-machined components serving the aerospace, defence and power generation sectors, to India's PTC Industries Ltd, a prominent player in the engineering industry. The acquisition follows TRAC's remarkable turnaround, which saw the company return to profitability and achieve sustained growth. Rcapital took ownership of TRAC in 2022 after a period of underperformance under its previous US corporate and private equity owners. As an independent entity, TRAC underwent a comprehensive transformation under the leadership of Managing Director Liam Bevington. Key changes included operational restructuring and the establishment of a new corporate identity to emphasise its independence and renewed focus. Significant investment in innovation, particularly in upgrading machinery, was a cornerstone of TRAC's revival. The company leveraged these advancements to maintain strong relationships with its blue-chip client base while securing new orders, reflecting its reputation for operational excellence and cutting-edge engineering. These efforts resulted in sustainable revenue growth and a solid return to profitability over the past two years. Rcapital's strategic support and targeted investments positioned TRAC as an attractive acquisition target for PTC Industries, which is known for its expertise in advanced engineering solutions. This acquisition will likely enable TRAC to further expand its capabilities and market reach under PTC's global leadership.

Tex-Tech completes acquisition of Fiber Materials

Tex-Tech Industries, Inc. (Tex-Tech), a provider of high-temperature and high-performance specialty materials and coatings, has successfully completed the previously announced acquisition of Fiber Materials, Inc. (FMI), based in Biddeford, Maine and Woonsocket, Rhode Island, from Spirit AeroSystems. FMI is a prominent player in the field of high-temperature materials and reinforced composites, specialising in carbon/carbon and related composites. Its products are used in critical applications, including thermal protection systems, re-entry vehicle nose tips, rocket motor throats, and nozzles. FMI's materials are installed on key defence platforms as well as NASA programmes such as Stardust, Mars Curiosity, Orion and Mars 2020. The company employs around 400 people, with the existing senior management team remaining in place at FMI. "The acquisition of FMI is highly complementary and strategic for Tex-Tech," said Scott Burkhart, Tex-Tech's Chief Executive Officer. "The addition of FMI enriches our portfolio of thermally protective materials with a unique set of high-performance products. FMI's capabilities will allow us to better meet the demanding material requirements of the rapidly expanding space and defence industries." "We are excited to join forces with Tex-Tech," said Matt Bernier, FMI's General Manager. "This acquisition is a testament to the remarkable achievements of our team and sets the stage for an even brighter future. With the combined capital, expertise in material science, and manufacturing capabilities, we will leverage our strengths to continue delivering innovative solutions and exceptional value to our customers.

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RB211-535 maintenance
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Approaching Retirement Age

An Insight Into Maintenance Management of Aged Aircraft Engines

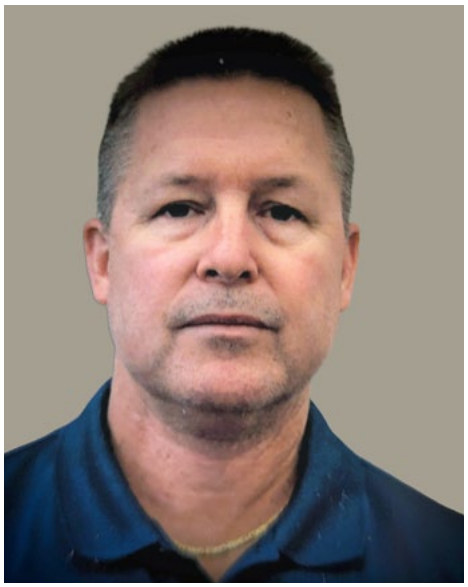
By David Dundas

As technology changes and new materials are being used in the construction of aircraft engines, so these engines have a longer lifecycle and this, in turn, requires adapted maintenance management programmes. More recently, the considerable delays and backlogs relating to the delivery of new aircraft has seen the lifecycle of legacy aircraft extended, creating even more challenges for engine MRO specialists. To find out more about the challenges and vagaries of maintaining aged aircraft engines, we enlisted four of the industry's leading engine MROs to share their thoughts with us.

What is classed as an aged aircraft engine and what challenges are associated with its maintenance?

For Virgil D. Pizer, Chief Executive Officer, Pem-Air Turbine Engine services: "An aged aircraft engine refers to one that has been actively used for an extended time, often surpassing its intended service life. This definition focuses more on its operational history— such as flight hours and the number of take-off and landing cycles—rather than its actual chronological age." In terms of the unique challenges presented by aged engines, Virgil identifies corrosion and fatigue as ones which can lead to weakened metal components and the compromising of structural integrity. Where maintenance needs are concerned, shop visits tend to be more frequent and inspections more comprehensive, while

> ***"An aged aircraft engine refers to one that has been actively used for an extended time, often surpassing its intended service life."***
>
> *Virgil D. Pizer, Chief Executive Officer, Pem-Air Turbine Engine Services*



Virgil D. Pizer, Chief Executive Officer, Pem-Air Turbine Engine Services

there are also difficulties associated with finding spare/replacement parts. You then have to add rising costs through specialised repairs and increased labour hours with meeting new regulations that were not in place when legacy engines were produced and expenditure and retrofits and associated technology.

Abhijeet Dey, Director of Asset Management, Setna iO, LLC. is aligned with Virgil D. Pizer, advising that: "Aged engines are generally those motors that have been in service for a long period of time (hours /cycles). Such engines suffer internal hardware and performance degradation due to operational duress." He adds that: "Most matured engines in today's civil aviation industries have a fleet with a large number of aged engine still operating. The biggest challenges are keeping up with its performance and operational efficiency while keeping up with Maintenance cost and risk involved. In the case of aged, 'matured' engines, it is much about following a defined work scope generated over years of operational history of such engine types."

At StandardAero, David Williams, Director of Global RB211 Sales adds an additional viewpoint in that as far as the industry is concerned, there is no formal definition of what constitutes an aged engine but he adds that a key common factor is often that the powerplant in question is no longer in production. "While on the one hand this means that operators no longer have to compete with the production line for parts, it may also mean that the OEM's own supply chain focus has switched to newer models, resulting in longer parts lead times and sourcing challenges. Likewise, the OEM's repair development focus may switch to newer powerplants, leaving operators reliant on third parties for new component repair schemes," he says.

John McCarthy, Director Business Development, Europe, VAS Aero Services is more precise in his opinions of what constitutes an aged engine, with good reasoning: "VAS Aero Services views an aged aircraft engine to be typically in the range of 18 years or older, a generation of engines which were considered leading technology in the 1990s and having strong production rates through the 2010s. Likely its design and technology will be derived from the cutting-edge engineering of the 1970s and 1980s." He then adds that "The unique challenge with older engines, in the event of problems with the engine, entails the decision between repairing or replacing the unit. This decision will be much more sensitive to the repair investments involved, including the lead-time to accomplish the full scope of work. An unplanned expensive shop visit will likely be the end of the engine's operational life."

Strategies which have proven most effective in extending the service life of older engines

On the operational side, engine derating and economical flight routes often play a key role to ensure the lengthening of the on-wing time of engines. In the opinion of Abhijeet Dey, it is also important to keep "the engine's internal hardware up to date with latest SBs and ADs as well as ensuring that regular maintenance is carried out (enhanced condition monitoring). Also, it has been observed that many operators who had gained in-depth experience of operating such engine types ensures a regular communication with the OEM to keep the MPD task updated/revised based on their operational experience."

One strategy undertaken by OEMs can be to team up with a trusted MRO provider, who then becomes the end-of-life engine maintenance service partner for an aged engine. According to David Williams, "Rolls-Royce has taken this approach on the RB211-535 turbofan, which powers over 60% of the 530+ Boeing 757s still in service, selecting StandardAero as its life-of-type partner for the engine in 2018." On the other hand, John McCarthy succinctly concludes that: "Optimum use of on-wing maintenance has proven very effective in extending the life of older engines. Procedures such as top and bottom case blade replacement and boro blending will optimize an engine's life while avoiding the considerable costs of an engine shop visit."

Virgil D. Pizer provides a comprehensive list of strategies to be adopted, advising that conducting regular and detailed inspections enables the early detection of wear and tear, corrosion, and fatigue damage, while utilising premium lubricants and conducting regular oil changes can greatly minimise engine wear. He also suggests that regularly performing overhauls and reconditioning of engine components can rejuvenate performance and prolong the engine's lifespan, while adopting modern technologies like advanced monitoring systems and diagnostic tools can enhance engine performance and foresee potential failures before they happen. He mentions that certain operators collaborate with engine manufacturers to prolong the time between overhauls (TBO) by demonstrating reliability and adhering

John McCarthy, Director Business Development, Europe, VAS Aero Services

> ***"USM continues to be a preferred choice for mid-life and mature engine platforms due to its cost savings and just-in-time availability."***
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to proper maintenance protocols, and that modifying flight operations to lessen engine stress, like optimizing take-off and landing procedures, can help reduce wear and prolong the engine's life. He concludes that: "By implementing these strategies, airlines and maintenance providers can successfully prolong the service life of older aircraft engines, ensuring both safety and reliability while efficiently managing costs."

Engine types best suited to increased use of used serviceable material (USM)

USM can be a valid option for operators facing long lead-times for new parts, especially when operators have specific requirements for how many cycles remaining they want out of their engines. A key driver with regards to the use of USM is – of course – the availability of good quality material, i.e., from retired engines. David Williams explains further. "As such, a well-structured fleet retirement by a major airline with good maintenance practices will often result in the most attractive pool of USM, e.g., compared to aircraft (and engines) which have seen use with multiple operators, and which are thoroughly worn out by the time they reach the boneyard. Older types will occasionally come back into demand as a result of operational issues with newer models, which may then limit the availability of good quality USM. This has recently been the case with the A320 / B737NG and the CFM56-5B/7B / V2500, following the in-service issues affecting the A320neo and 737 MAX."

Virgil D. Pizer provides some excellent examples of older engine types that lend themselves well to the increased application of USM, such as the CFM56 Series of engines which is extensively utilised in both narrow-body and wide-body aircraft, resulting in a large availability of USM parts thanks to its widespread use over the years. He also includes the GE90 series employed on Boeing 777 aircraft and the V2500 Series which is predominantly used on Airbus A320-family aircraft. "Utilizing USM can result in substantial cost savings, with these parts typically being 60-80% less expensive than new OEM parts. Moreover, the ready availability of USM parts assists airlines in controlling maintenance costs and minimising downtime," he concludes.

Beyond the CFM56, GE90 and V2500 series of engines, Abhijeet Dey also includes the PW4000 and CF6-80 on the list of engine types, pointing out that such engine programmes have the following factors working in their favour:

- A significant number of engines have been retired and torn down
- There are multiple options for component repair due to the availability of many repair facilities
- There are fewer OEM-driven USM programmes
- There is easy availability of USM to assist in rebuilding of engines or for any MRO shop visits
- The development of multiple OEM-approved repair programmes for USM

John McCarthy is of the opinion that the cost-saving benefits of using USM parts can be applied to almost all engines at all stages of life. He points out that "USM continues to be a preferred choice for mid-life and mature engine platforms due to its cost savings and just-in-time availability. As a leading supplier of USM from engine teardowns and surplus inventory re-distribution, VAS provides ready access to critical USM engine parts to aircraft operators around the world."

What should we take into account when replacing life-limited parts?

In an ideal world, when replacing an LLP, the LLP's remaining life would be matched to the expected remaining life of the engine. In some cases, an LPT module replacement can be planned into the programme, which means that out-of-life sequence LLPs can be used. John McCarthy suggests that: "If there are LLPs in the engine that have far more life than the expected life of the engine, the operator should consider exchanging these for more optimised LLPs. The advanced USM community is very capable of capitalising on situations like this."

Virgil D. Pizer looks at the situation in close up, identifying eight key factors which should be considered to ensure safety, compliance, and cost-effectiveness:

- Adherence to Regulations: Confirming that the replacement parts comply with aviation authority regulations, such as those set by the FAA or EASA.
- Part Quality and Certification: Ensuring the use of only certified, high-quality parts that have undergone rigorous testing and received approval for use.
- Compatibility: Ensuring that the replacement parts are compatible with the existing engine and its components.
- Remaining Life: Taking into account the remaining service life of the replacement part.
- Cost Considerations: Assessing the expenses related to replacement parts and their associated maintenance.
- Documentation and Traceability: Ensuring thorough documentation and traceability for all replaced parts.
- Manufacturer Recommendations: Following the manufacturer's recommendations for replacement intervals and procedures.
- Operational Impact: Evaluating how the replacement will affect the aircraft's operational schedule.

As already noted, some operators will

have specific requirements for cycles remaining, based on their expectation of how long an aircraft will remain in service, which will determine the choice of new parts versus USM. As David Williams points out: "Where USM is utilised, it is of course essential that operators have full 'back to birth' traceability for any LLP, in order to ensure the integrity of the components in question." On a different tack, Abhijeet Dey is keen to point out that one of the key factors "...will be to determine how many cycles of on-wing green time are we looking to attain from the engine. In theory the second-run engine always has lesser time on wing (TOW) as compared to first-run engines. So, to install NEW LLPs or high CR LLPs in such engines will not be economical. The cost-to-cycle ratio is the most important factor when it comes to LLPs."

The main challenges maintenance teams face when sourcing parts for older engines

According to David Williams at StandardAero: "one of the biggest frustrations faced when sourcing parts for older engines is facing the scenario where the rebuild of an engine is held up by a handful of components (or just a single obscure part). This of course highlights the importance of kitting an engine prior to commencing work on it, and – in turn – of ensuring that Cycle 1 (inspection) activity is sufficient robust to anticipate the engine's material requirements. In terms of sourcing parts, it's important for supply chain teams to have a broad network of contacts with parts supply specialists and asset management companies, as those obscure parts can sometimes be found in the strangest places!"

Abhijeet Dey, Director of Asset Management, Setna iO, LLC

Abhijeet Dey at Setna iO, LLC. Feels that many of the older engines have a lower mod status and when time comes for replacement of component for such engines, there might be a situation where either the component has become obsolete after the OEM has stopped production, no USM is available since older PNs have been upgraded due to SB / AD requirements, or some parts that are very old might not have the best trace documents. He comments: "Also, in some cases, the cost of such components might be really high due to limited availability and can cause financial distress for the operators/engine lessor."

At VAS Aero Services, John McCarthy feels that one of the key challenges in the current market environment includes the availability of certain high-demand parts, pointing out that in many cases where USM parts are not available, maintenance teams must purchase new parts to complete maintenance events within contractual timelines. He adds that: "... depending on the part, it may be possible to realise residual value for the new parts when the engine comes to end of life," while concluding that: "Establishing thorough engine documentation and shop visit records allows USM companies to better understand the optimal value of the engine."

Virgil D. Pizer at Pem-Air Turbine Engine Services has created a shortlist of the main challenges, to include supply chain disruptions, high demand for USM, diminished availability, obsolete parts, cost, regulatory compliance, and documentation and traceability. "These challenges necessitate maintenance teams to be resourceful and proactive in sourcing parts, frequently depending on aftermarket suppliers, repair vendors, and innovative solutions to ensure the continued operation of older aircraft engines," he advises.

At what point is an engine deemed "beyond economical repair" and should therefore be replaced?

This is partly a financial decision that takes into consideration the current book value of the engine, the maintenance event cost, and the projected value of the engine on its planned retirement, while another factor to consider is the likelihood of the engine running until its planned retirement and the potential to incur additional costs to keep it running. Additionally, an unplanned maintenance event close to retirement will result in a compromised financial situation.

As John McCarthy suggests, "It's a balance of financial and engineering experience, and working closely with the USM community and engine shops to see where the optimum can be found. Experienced USM suppliers such as VAS can support airlines and lessors with tailored solutions to help them maximise the value of their engine assets."

In general terms, an aircraft engine is considered "beyond economical repair" (BER) when the expense of repairing it surpasses the cost of replacing it with a new or refurbished engine. According to Virgil D. Pizer, this determination is generally based on a cost-benefit analysis that takes into account factors such as:

- Safety and Reliability: Confirm that the repaired engine adheres to all safety and reliability standards.
- Regulatory Compliance: Adherence to aviation regulations and standards. If repairs cannot guarantee compliance, replacement may be required.
- Repair Costs: The overall expenses associated with repairing the engine, encompassing labour, parts, and any additional testing or certification needed.
- Remaining Life: The anticipated remaining service life of the engine post-repair. If the engine has already gone through a significant portion of its lifecycle, investing in repairs may not be justifiable.
- Operational Impact: The downtime and operational disruptions resulting from

> ***"...the cost of such components might be really high due to limited availability and can cause financial distress for the operators/engine lessor."***
>
> *Abhijeet Dey, Director of Asset Management, Setna iO, LLC*

RB211-535 on test © Standard Aero

the repair process. If the engine is vital to operations, the effects of prolonged downtime may sway the decision.

"When these factors suggest that repairs are not economically viable, the engine is classified as BER and should be replaced," he concludes.

Meanwhile, David Williams advises that: "The calculation of whether an engine is BER will depend on the cost estimation performed after Cycle 1 (i.e. based on estimated new parts, USM and repair costs), and the customer's own assessment of the engine's economics. One customer may consider a repair estimate to render the engine BER, while a second may consider the bill to be acceptable, depending on their respective needs. Customers will sometimes ask an MRO to consider a 'Frankenstein' build, i.e. utilising multiple donor engines to create a single airworthy powerplant. This approach may or may not be economical, depending on the condition of the donors and the cost of disassembly and rebuild."

Abhijeet Dey sums the situation up nice and succinctly: "If the business case for the engine repair is not viable enough to show positive revenue earnings, the engine can be declared as BER. At any given moment if the teardown value of the engine is more than the operational income of the engine, the engine should be taken off wing for part-out."

Are there any restrictions regarding economic repair if it is a leased engine?

In David Williams' opinion: "Lessors have an extremely good understanding of their assets, in terms of financial, technical and operational considerations. As such, a lessor will have a clear view of what represents an economical repair, and what numbers don't work. Lessors may be less likely to accept the use of parts manufacturer approval (PMA) components, since this may impact the value of their assets and the willingness of certain end-users to lease them. Approaching the problem from a slightly different angle, John McCarthy believes that: "The decision to repair or not to repair is similar, whether the engine is owned by the operator or leased. If the repair cost does not make economic sense, it is common with aircraft leases for the Lessor to provide a replacement engine to power the aircraft to the end of the aircraft lease."

Certainly, there are a number of restrictions when it comes to the economical repair of leased aircraft engines. These restrictions generally arise from the terms and conditions specified in the lease agreement between the lessor and the lessee. Virgil D. Pizer suggests these restrictions will be based on a combination of the lease agreement provisions, regulatory compliance, the Continuous Airworthiness Maintenance Programme (CAMO), and approval from the lessor. He rounds off by saying that: "It's paramount to review the specific lease agreement and consult with the lessor to comprehend any restrictions or requirements related to the economical repair of leased aircraft engines."

Clearly in the case of leased engines, the lease return terms and conditions are going to play a vital part. As Abhijeet Dey points out: "In such situations, the lessor has the final say if they want to proceed with utilisation of the accumulated maintenance reserve and LLP reserve for the proposed shop visit or just retire the engine. In the constantly evolving Aero Engine industry, the demand of particular engine type decides whether a US$5m shop visit is economical or if it renders the engine BER. He also points out that: "During the aftermath of COVID-19, a majority of first-run CFM56-7B engines were being retired due to low demand and were routed for teardowns. However, today, most of the 7Bs are now being routed for rebuild due to the high demand."

> ***"Lessors have an extremely good understanding of their assets, in terms of financial, technical and operational considerations."***
>
> *David Williams, Director of Global RB211 Sales, StandardAero's Airlines & Fleets Team*

David Williams, Director of Global RB211 Sales, StandardAero's Airlines & Fleets Team

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Availability is Crucial

Simplifying the Procurement Process

By David Dundas

When you realise that in an Airbus A320 there are roughly 340,000 parts and approximately 367,000 in a Boeing 737, is it any wonder that the procurement process is such a key element for those involved in the maintenance and upkeep of such technologically complex aircraft. In fact, procurement is only one aspect of the many challenges faced by MROs who rely on efficiency and cost effectiveness to remain competitive. However, in this particular instance we wanted to learn more, in particular, about today's procurement processes, and we approached two companies who are in an ideal position to answer our questions – VAS Aero Services and Werner Aero. Their input into this article is greatly appreciated.

Is it much more difficult to search for such parts than to get the material directly from the manufacturer or authorised dealers?

USM and surplus new parts are very attractive in the aftermarket due to their substantial cost savings versus new OEM parts, particularly when manufacturing lead-times do not meet customer operational timelines. There are a few key considerations that make sourcing these parts more challenging, such as the condition and certification status, traceability paperwork, and regional access locations. Mike DeMicco, Senior Vice President Sales & Material Management, VAS Aero Services explains further: "All of these are solid reasons for establishing a close relationship with an aftermarket USM supply partner such as VAS who has the resources, experience and inventory to meet an operator's needs, saving time and money in the long run. We do the upfront due diligence on parts validation and conformance, including rigorous inspection; we make sure that part histories, certification and documentation accompany each part we sell, and we enforce a strict Suspected Unauthorized Parts (SUP) policy to protect aircraft safety. Thanks to our active airframe and engine acquisition and teardown programme, VAS has strong inventory coverage of critical USM parts covering most platforms." Tony Kondo, President & CEO, Werner Aero, LLC. adds that in relation to any difficulty: "This must vary by parts number. Lead times for new parts from manufacturers can sometimes be too lengthy, prompting customers to turn to USM suppliers like Werner Aero."

Are there IT solutions that help source spare parts, and can these be integrated with typical mainframe systems?

Tony Kondo makes his thoughts very clear on the matter, underlining the benefits and effectiveness of direct person-to person contact. "There are several web-based platforms available to help customers find USM (Used Serviceable Material) in the market.

However, the most effective way for customers to actually purchase parts is still by reaching out directly via email or phone to a reliable contact. This personal approach ensures faster responses, better guidance, and a more tailored service," he states.

Mike DeMicco on the other hand has a very positive attitude towards the benefits of IT-related solutions. He points out that: "There are definitely IT solutions that facilitate sourcing spare parts, and many of these can be integrated with mainframe systems through APIs, middleware, EDI, or custom interfaces. The integration allows for more efficient procurement, better inventory management, and greater transparency in sourcing used or surplus parts, ultimately reducing costs and improving operational efficiency. VAS works with customers to provide a seamless process of inventory search and pricing, request for quotation, sales order agreement, and parts fulfilment." He then adds that the company "... has invested over US$30 million in dedicated IT infrastructure and enhanced capability for aftermarket business solutions. For example, our customised SAP system seamlessly integrates with customers' systems for aftermarket programmes, automated quotations and inventory management, and programme management."

Mike DeMicco, Senior Vice President of Sales & Material Management, VAS Aero Services

We wanted to find out what was considered the most important material master data that must be made available to the buyer.

Any parts procurement system can only work smoothly if both the buyer and the seller can access a very accurate material database as an accurate and comprehensive material master database is critical to sourcing spare parts and covers a range of vital data points, including: the part number and description, manufacturer information, material specifications and technical data, condition/serviceability status, pricing (including any additional charges or applicable discounts), lead time and availability, certification and traceability documentation, packaging and shipping details, plus any warranty and returns policy. According to Mike DeMicco, "These data elements help ensure the buyer has access to all the necessary details for evaluating, purchasing, and receiving the right part. Maintaining this material master database with a high level of accuracy is a significant task requiring in-depth platform knowledge, a keen understanding of market trends and a team of experienced parts evaluation specialists. That's the added value that qualified USM suppliers such as VAS offer the aftermarket, helping clients reduce procurement errors, optimise inventory, and meet operational and financial goals." As Tony Kondo succinctly puts it: "Accurate availability is crucial. Without it, searching the database for parts becomes an ineffective use of time."

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We wanted to know more about elements of the procurement process which can be automated, and which should be carried out manually.

The procurement process begins with the identification of demand and ends with the successful receipt of goods in the system. Assuming that all information and data is available to buyers and sellers, should the process be fully automated, except for the receipt of goods? Are there any control points which should not be automated? In response to these questions, Mike DeMicco suggests that: "In an ideal scenario with accurate data, many steps of the procurement process—from demand identification to part selection and availability verification to purchase order creation and tracking—can be automated, significantly reducing the need for manual intervention. However, control points where exceptions occur, regulatory compliance needs to be verified, paperwork validated, and custom shipping is required will still require manual oversight." Tony Kondo once more gets straight to the point when he says: "The KYC [Know Your Customer] process cannot be fully automated."

What do you generally recommend that will make the procurement process faster and more efficient?

We know that every manager is interested in having a procurement


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process which is both efficient and cost effective. However, the challenge is to identify what is primarily required to achieve this and then identify and overcome any particular obstacles that could hinder the process. Werner Aero's Tony Kondo is very clear in his opinion, and particularly in relation to knowledge and experience. "Buyers should be equipped with proper education and experience to make informed decisions.


Tony Kondo, President & CEO, Werner Aero LLC.

For example, they need to understand the differences between Overhauled (OVH) and Serviceable (SV) conditions, particularly in terms of price, warranty, and overall value," he says.

At VAS Aero Services, Mike DeMicco expands further on the matter, advising that: "To make the procurement process faster, more efficient, and cost-effective, several strategies and best practices can be implemented. These focus on automation, process optimisation, supplier relationship management, and data integration. However, there are also common obstacles that can hinder procurement efficiency, which need to be addressed to ensure smooth operations." He then adds: "Automating routine tasks, such as establishing reorder thresholds, can assure continued parts availability and uninterrupted maintenance cadence. Leveraging AI for predictive analytics and demand forecasting aids planning and reduces supply gaps. USM leaders such as VAS rely on Electronic Data Interchange to facilitate customer ordering and invoicing, reducing manual intervention and speeding up the procurement process. Working closely with a strong aftermarket parts supply partner will alleviate bottlenecks and result in more efficient and cost-effective parts procurement."

From what our two respondents have had to say, it would seem that while there is a place for automated systems in order to improve efficiency in the procurement process, we are still a long way off fully automated ones as there is still a (beneficial) reliance on person-to-person contact, as well as a required manual input into the packaging and dispatching aspects, along with receipt and distribution of ordered products once received.

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A330neo flight deck
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From Reactive to Predictive Practices

The Evolution of Aircraft Component Maintenance

By David Dundas

Ever since the first days of powered fight, aircraft component maintenance has changed almost beyond recognition. From rudimentary inspections in early aviation to today's sophisticated predictive maintenance systems, the evolution reflects advancements in materials, technology, safety standards, and operational efficiency. Here we want to trace the development of aircraft component maintenance and highlight the key milestones that have shaped this sector of the commercial aviation industry.

From reactive to preventative maintenance

In the early 20th century, aircraft maintenance functioned on a primarily reactive basis. In simple terms, maintenance activities were carried out after a component failed or there was considerable visible wear and tear. Pilots and mechanics relied on rudimentary tools and limited personal experience to inspect aircraft and carry out any necessary repairs to components. The lack of formal standards and little or no documentation often led to inconsistent practices and dramatically compromised safety. However, that was to change dramatically with the onset of the First World War.

While the war between the Turks and Italians in 1911 saw the first use of aircraft in combat, the First World War, or The Great War as it is also known, was the first global conflict that involved aircraft. Initially those used were unarmed and flown for reconnaissance purposes, but during the build-up to the war and the first year, manufacture of combat biplanes became paramount. With their manufacture came a volume of aircraft and the requirement for constant maintenance and upkeep, repairs and replacement of parts after almost every flight. While repairs were intended to keep aircraft airworthy, strict maintenance procedures were introduced in order to minimise the risks of mechanical and structural failure during combat.

In the post-war period during the 1930s, both commercial and military aviation developed scheduled preventative maintenance programmes, for the first time adopting a more proactive as opposed to reactive maintenance and upkeep strategy

The introduction of preventive maintenance

Post-Second World War commercial airlines had developed much more robust time-based maintenance schedules which required that specific aircraft components be inspected and/or replaced after a specific number of flight hours or cycles had been completed. These more effective and rigorous practices were formalised with the establishment of aviation authorities such as the Federal Aviation Administration (FAA) in the United States in 1958, and the UK equivalent, the Civil Aviation Authority (CAA) in 1970.

It was during this period that the concept of Maintenance, Repair, and Overhaul (MRO) and appropriate facilities also emerged. These facilities centralised maintenance operations, enabling more thorough inspections and overhauls of

critical components such as engines, landing gear, and avionics systems. Such dramatic changes to the 'behind the scenes' operations had become a critical element of commercial aviation through the increasing complexity in design and structure of commercial aircraft. After all, it was in 1952 that the first commercial 'jetliner' entered service, the BOAC Comet 1, built by De Haviland and which could carry 36 passengers.

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The paradigm shift to reliability-centred maintenance (RCM)

The 1960s and 1970s saw the introduction of what became known as reliability-centred maintenance (RCM). Initially unique to and pioneered by the airline industry, RCM placed appreciably greater emphasis on maintaining the inherent reliability of components rather than adhering strictly to time-based schedules. This approach differed considerably to previous MRO practices as it recognised that some components degraded predictably while other components were prone to failure on a random basis. One must remember that we are talking about a time where parts' design and manufacturing processes were such that, as with all new technology at the time, there was a propensity for the structural failure of a small percentage of parts over time for reasons other than wear and tear.

In 1970, Boeing's 747, the 'Jumbo Jet', first entered into commercial service with Pan Am, and overnight, RCM became a cornerstone of the Maintenance Steering Group (MSG) approach, which was first applied to this aircraft. The MSG framework outlined systematic processes to determine optimal maintenance tasks, focusing on safety and cost-effectiveness. So ground-breaking and effective at the time, this methodology is still used today together with continuous updates to address the ever-changing challenges of the aviation sector.

The digital revolution has ushered in massive technological changes

It was in the 1990s that technological advancements saw a virtual avalanche of changes that helped to totally revolutionise component maintenance. The driving forces behind many of these changes was the search for materials that would minimise weight and maximise structural performance, improve damage tolerance and corrosion resistance, as well as reduce manufacturing and maintenance costs. Consequently, new materials introduced into aircraft structures included:

Carbon fibre composites which were used in secondary structures like engine cowlings and undercarriage doors. Carbon fibre-reinforced plastic was used in the A310, while the 787 Dreamliner was the first large commercial aircraft to use carbon composite in more than half of its fuselage. Additionally, we had other new materials such as aluminium-lithium alloys and superplastically (SPF)/diffusion bonded (DB) titanium, the latter being a new material that was likely to be used in aircraft structure. We also had polymer matrix composites, carbon nanotubes (CNTs), and phenolic composites which were used in aircraft cabins as those composites were resistant to chemicals, heat, and fire.

Along with new materials came new MRO procedures and techniques including non-destructive Testing (NDT) such as ultrasonic, radiographic, and eddy current testing which enabled the detection of defects without dismantling components. While the integration of digital avionics systems improved diagnostics and troubleshooting, reducing maintenance time and costs, computerised maintenance management systems (CMMs) streamlined maintenance planning, tracking and documentation, ensuring compliance with regulatory standards.

The Age of Predictive Maintenance

More recently, predictive maintenance has emerged as the gold standard in aircraft component maintenance. Powered by data analytics, artificial intelligence (AI), and the Internet of Things (IoT), predictive maintenance uses real-time data to anticipate component failures before they occur. Three key developments include health monitoring systems where today's aircraft are now equipped with sensors that monitor the performance of critical systems and components, enabling early detection of anomalies. The introduction of big data analytics now means airlines and MRO providers can leverage vast amounts of operational data to identify patterns and predict maintenance needs. Finally, we have 3-D printing, a relatively new technology which facilitates the rapid production of replacement parts, reducing lead times and inventory costs.

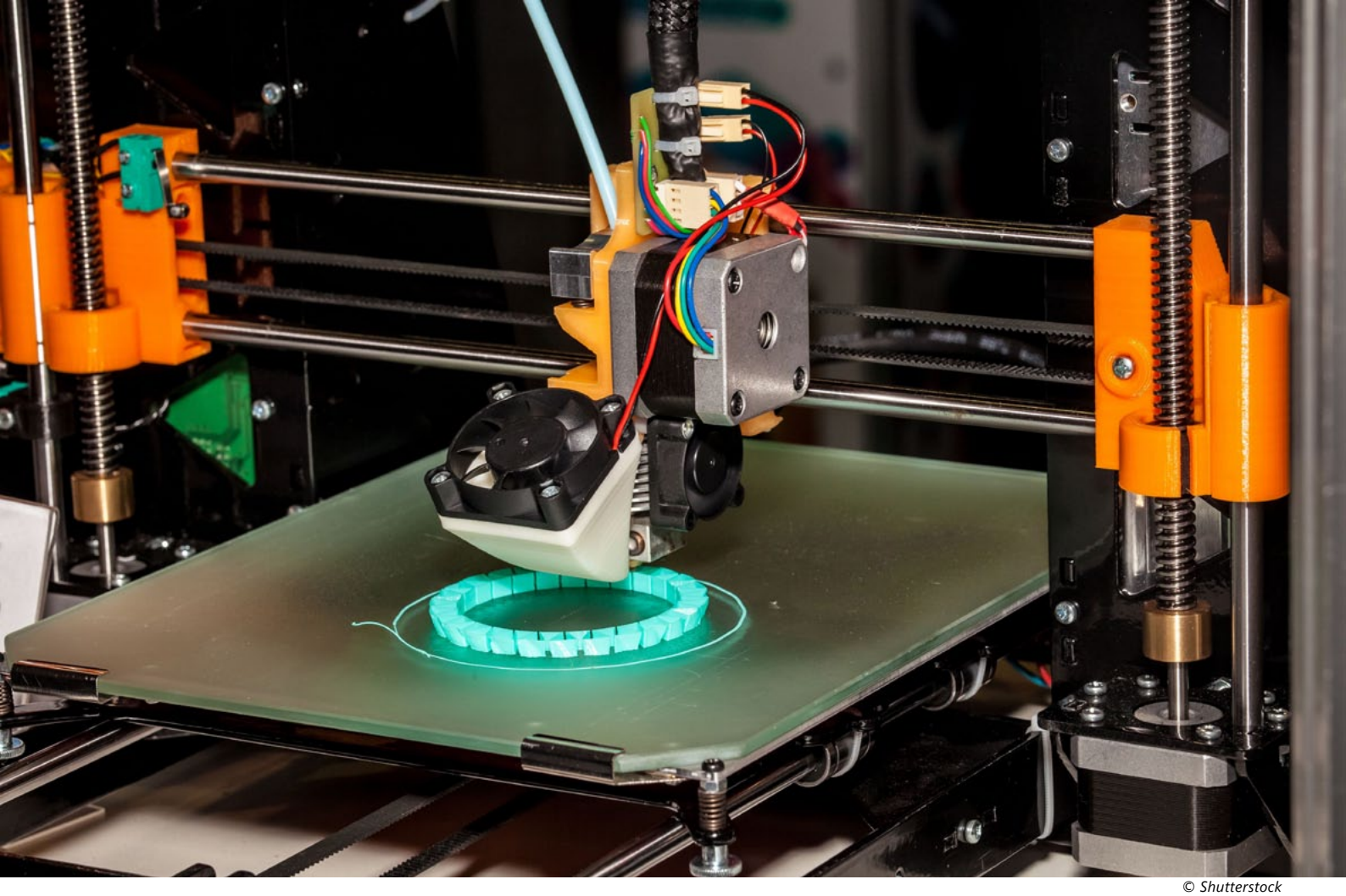
Regulatory and Environmental Considerations

As the aviation industry evolves, maintenance practices are increasingly shaped by regulatory and environmental concerns. Stringent emissions regulations have driven innovations in engine maintenance, while sustainable practices, such as recycling components, are gaining traction. Regulatory bodies like the European Union Aviation Safety Agency (EASA) and the FAA continue to update maintenance standards to keep pace with technological advancements.

Challenges and Future Directions

Despite progress, challenges remain. The global shortage of skilled technicians poses a significant hurdle, as does the complexity of integrating new technologies with existing systems. Looking ahead, advancements in AI, digital twins, and blockchain are expected to further enhance the efficiency and reliability of component maintenance.

As we have seen, the development of aircraft component maintenance reflects the broader evolution of aviation. From reactive repairs to predictive strategies, each era has contributed to safer, more reliable, and cost-effective air travel. As technology continues to advance, the future of aircraft component maintenance promises even greater innovation, ensuring that aviation remains one of the safest modes of transportation.



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How 3-D Printing is Helping to Transform the MRO Side of the Aerospace Industry

By David Dundas

As with most groundbreaking new technologies, it took a while before 3-D printing became mainstream and even longer for it to be adopted by the aerospace industry. It was way back in 1984 that Chuck Hall developed Stereolithography (SLA), a specific technique which involved curing photosensitive resin with UV light to build objects layer by layer. SLA marked the beginning of additive manufacturing technologies and is seen as the birth of modern 3-D printing. That developed into Deposition Modelling (FDM), which was a heavily patented form of 3-D printing. However, come 2008 the patents surrounding FDM expired and suddenly, the restrictions on who could use 3-D printing technology to their advantage were lifted. The rest, as they say, is history.

In this article we want to delve into how 3-D printing has become a key driver for MROs in helping to improve efficiency, enhance operational readiness and revolutionise certain maintenance practices.

A key solution to many supply chain problems

Ask any MRO operation what the greatest challenge they currently face is, and supply chain problems are likely to come at the top of their list. This is where 3-D printing has come into its own as it bypasses the supply chain almost completely. Now here one has to acknowledge that when it comes to the manufacturing of any spare parts for an aircraft, safety has to be first and foremost as the aviation industry is a complex and highly regulated sector, where safety, efficiency, and innovation have to effectively converge to ensure seamless operations. Consequently, there is a limit to the type of spare parts that can be printed three dimensionally. In general terms these parts will be made from composite materials (e.g. carbon fibre) that can be easily incorporated within an existing structure, and hence why this technology is also referred to as additive manufacturing (AD). The advantages presented by 3-D printing are that it is extremely accurate, of the highest quality, and involves minimal wastage, enabling the manufacture of extremely complex and also customised parts.

Where can 3-D printing be applied in the aircraft maintenance sector?

The most obvious use for 3-D printing is for spare parts. As mentioned, by-passing the supply chain solves many current problems, while also reducing the costly need to hold extensive inventory and also avoid lengthy lead times for parts' delivery. 'On-demand' production is cost- and time-effective, especially as maintenance crews can manufacture needed parts on site or near to maintenance facilities which can also help to significantly reduce down time.

Additionally, aircraft maintenance often requires the use of unique tools tailored for very specific tasks, so there is the option of the rapid design and printing of lightweight ergonomic tools that are fit for purpose as well as printing standard tools on an as-and-when-needed basis.

One of the areas where 3-D printing proves its worth is for repair solutions. As is often the case, certain damaged components can be repaired as opposed to a much more costly replacement, assuming, of course, that structural integrity is in no way compromised. Additive manufacturing (3-D printing) can swiftly and in an extremely accurate manner, restore damaged parts by adding material to the damaged area. Other than saving on costs, this form of maintenance also helps with sustainability through the extension of a parts' lifecycle.

Finally, we have a necessity for 3-D-manufactured parts driven by the delay in aircraft deliveries, and that is because there are a good number of older, legacy aircraft that have remained operational well beyond planned retirement age. This means there is a shortage or USM (Used Serviceable Material) from teardowns, and often there is no longer the availability of OEM (original equipment manufacturer) parts either as there was no anticipated longer-term demand. Consequently, 3-D manufacturing has proved to be a gamechanger for MROs working on legacy aircraft.

The benefits of 3-D printing for MROs

As we have touched on above, there are several key benefits to using 3-D printing within an MRO set-up. First off, traditional manufacturing processes often involve extensive tooling and setup, which can take weeks or even months. With 3-D printing, parts can be produced in hours or days, drastically reducing lead times and enabling a quicker turnaround time for aircraft maintenance.

Second, we have cost efficiency. Admittedly there is a substantial, initial capital outlay to set up your 3-D printing capability, but over time, the ROI is significant as the cost savings for printed parts can be considerable. Beyond this, there is no supply chain to worry about, there is next-to-no supply chain, the lead-up time is nominal aside from allowing for design of the required part (where necessary) and, of course, there is a substantial reduction in the volume of inventory that needs to be held.

With the ability to manufacture your own bespoke tools comes the ability to find alternative solutions to accepted norms. This level of customisation is particularly valuable in maintenance scenarios where standardised solutions could be deemed inefficient or too time-consuming.

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Lastly, we have sustainability, where 3-D printing, or additive manufacturing, supports environmentally friendly practices by reducing material waste and energy consumption compared to traditional manufacturing methods. Beyond this, the ability to repair and refurbish components is very much in keeping with the aviation industry's goals where sustainability are concerned.

Challenges and limitations faced by 3-D printing

While we have looked at the many positive aspects of 3-D printing, it is clear that the technology also comes with certain industry-specific challenges. To begin with, there is the key element of ensuring safety, which comes in the form of regulatory compliance. In the aerospace industry, all aircraft parts must adhere to stringent safety and quality standards and, as a consequence, certification of 3-D-printed parts can be a complex and time-consuming process.

Next, we have the limitations placed on what can be manufactured using the 3-D printing process as there is a limit to the type of base materials that can be used for the purpose of printing. In simple terms, not all materials used in the manufacture of aircraft parts are suitable for 3-D printing. However, it is fair to say that considerable investment is currently being made in the area of research and development to expand the current list of usable materials.

We then have the problem of training operators of 3-D printing equipment as the types of printer we are talking about here are not the same as the small desktop 3-D printers many may be more familiar with. The printers we are talking about are not simply operated by changing cartridges and pushing the 'start' button and miraculously a perfect part appears.

Lastly, as also mentioned above, a 3-D set-up for printing aircraft parts will require considerable capital investment and consequently may price itself out of being an option for the smaller MRO operators.

What does the future hold for 3-D printing?

It is clear there is a well-established place in the MRO sector for 3-D printed parts, and a demand that will increase the longer legacy aircraft remain in operation and the number of teardowns fails to meet marked demand for USM. The potential for 3-D printing in aircraft maintenance continues to expand as technological advancements emerge. Innovations such as multi-material printing, faster production speeds, and improved material properties are poised to further enhance the capabilities of this form of additive manufacturing. Additionally, collaborations between aerospace companies, regulatory bodies, and technology providers are likely to streamline certification processes, making it easier to integrate 3-D printing into mainstream MRO practices.

To conclude...

3-D printing has already revolutionised aircraft maintenance by enabling rapid production of spare parts, customised tools, and innovative repair solutions. While challenges remain, the benefits—including reduced lead times, cost efficiency, and sustainability—underscore the transformative potential of additive manufacturing. As the technology continues to mature, it will undoubtedly play an increasingly pivotal role in ensuring the safety, efficiency, and operational readiness of the aviation industry.

The World Has Shrunk

Is Aircraft Base Maintenance in Western Europe Cost Competitive?

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By David Dundas

Sir Frank Whittle, the inventor of the jet engine is, ironically, referred to at times as "the man who shrank the world". For those who enjoy travelling for leisure purposes, the whole world is literally at their fingertips. In the business world, we now have access to markets that 100 years ago were subject to the time constraints of trade between the East and West via the Spice Routes or Maritime Silk Roads as they were called. Today we can order a product in China and have it delivered to our doorstep in under 72 hours if needed.

While this 'shrunken world' has been advantageous to some, it also creates a challenging business environment where countries with different economies vie for the same work contracts, and the commercial airline MRO industry is not excluded from that. Now that aircraft can fly further and more cost effectively, carriers today have a broader selection of MRO operators to choose from, and so we have to question whether base maintenance in Western Europe remains cost competitive.

Base maintenance, also known as heavy maintenance, involves resource-hungry, comprehensive inspections and overhaul activities, usually at dedicated facilities. Base maintenance can see an aircraft out of service for anything up to 30 days.

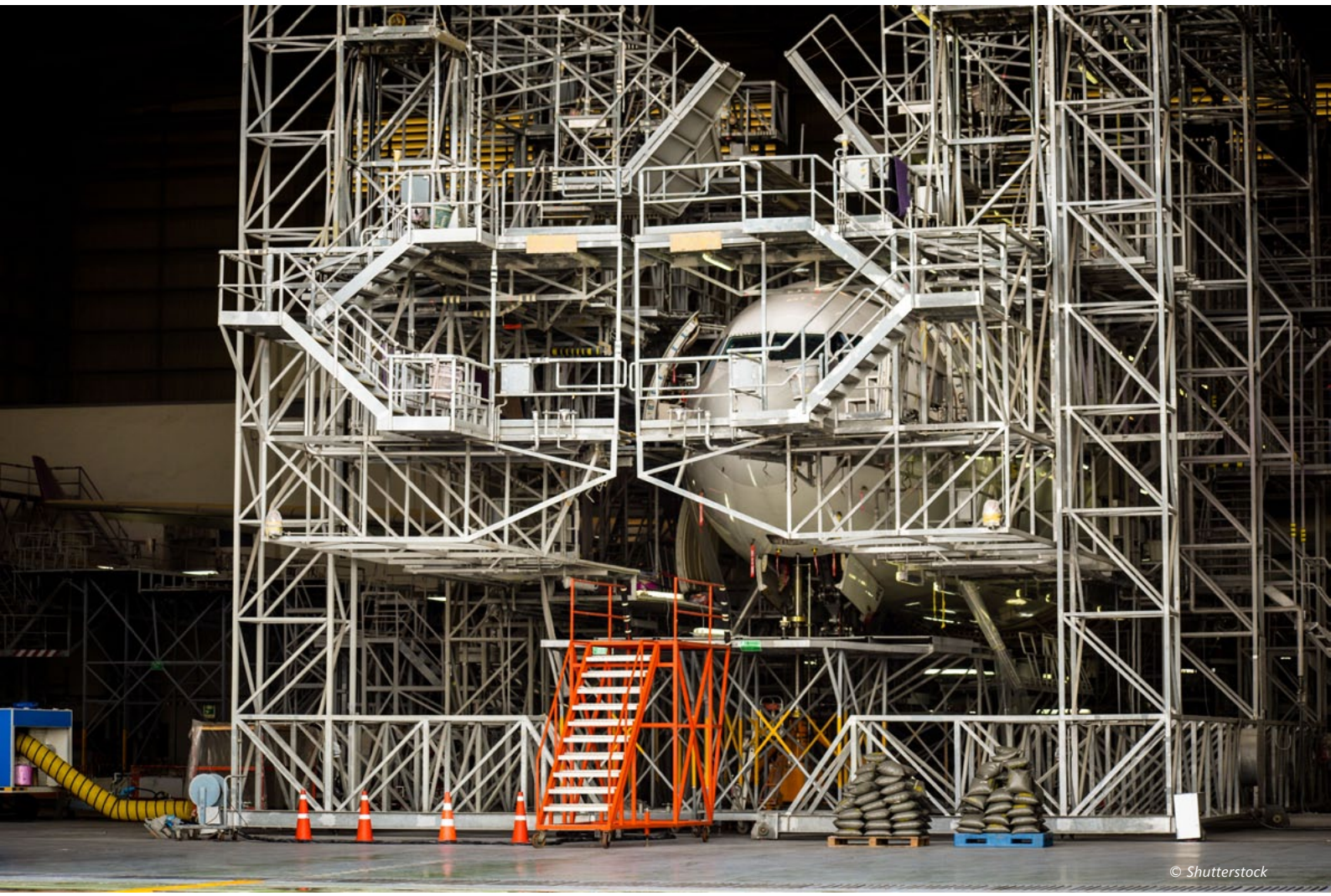
Factors affecting costs of base maintenance in Western Europe

Aircraft base maintenance is a critical component of aviation operations, ensuring the safety, reliability, and longevity of aircraft. In simple terms, it is not a process where you can 'cut corners' in order to become more competitive. However, is it fair to say that all operators across the globe are therefore 'competing on a level playing field'? No. And there are several factors which help to determine why this is the case.

First off, we have the economic landscape, then the regulatory environment, followed by operational constraints. As a result, we need to have a nuanced understanding of the many factors which can have an influence on base maintenance finances.

Let's begin with labour costs. While Western Europe is recognised as having a its highly skilled workforce, this comes at a price when labour costs are compared with other regions. Countries such as Germany, France, and the United Kingdom have stringent labour laws and higher wage structures, which have a significant influence the cost of base maintenance. When you then add the labour-intense nature of base maintenance tasks, such as detailed inspections, system overhauls, and structural repairs, this pushes these costs even higher. As we all know, skilled technicians also often have work for extended hours on tasks that demand precision and expertise in order to minimise the time an aircraft is grounded. Unfortunately, this does tend to add to the overall expense of base maintenance.

Next, we have the MRO facilities themselves, and those in Western Europe are rich in advanced technology equipment and infrastructure. While this certainly adds to the overall quality of the work provided, once again it comes at a cost and makes it harder to remain financially competitive. This situation is not helped by the actual costs of maintenance and other overheads for the facilities themselves. And as if that weren't enough to contend with, there is the constant need to invest in the business as new aircraft types often require new tools for maintenance, and new materials can affect maintenance procedures, necessitating further training. While this may be the same for all MRO operators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globally, the cost for Western European businesses is likely to be higher than in some Asian and Middle Eastern, as well as Eastern European locations.

Finally, we have geopolitical and additional economic factors. Today it is difficult to ignore fluctuations in exchange rates and volatile energy prices. Additionally, local taxes can substantially affect maintenance costs. Western Europe's higher cost of living and stringent environmental policies further add to operational expenses, while already high labour costs in Western Europe are compounded by compulsory benefits such as pensions, healthcare, and paid leave, which are often mandated by law. They also have to be provided in order to offer a competitive package for would-be employees, especially when there is a significant labour shortage in the MRO industry, particularly for skilled aircraft maintenance technicians. According to Oliver Wyman: "For the third year in a row, when asked what they expect to be the top disruptors for the MRO industry over the next five years, respondents to our 2024 MRO survey cited cost management and labour shortages as the top two disruptors".

Comparing Regions

When compared to Western Europe, Eastern Europe can be an attractive option for airlines seeking to reduce their MRO budgets, with its reduced labour costs and lower overhead expenses. Countries like Poland and Hungary have witnessed a rise in MRO activity due to their competitive pricing, even if Eastern European companies may lack the scale and technological sophistication of Western European counterparts. In truth though, the labour intensity of base maintenance may be more easily mitigated in Eastern Europe by employing a larger workforce at lower wages, even if this can sometimes lead to trade-offs in efficiency and expertise.

Over more recent years, Asia and the Middle East have emerged as competitive hubs for base maintenance. With lower labour costs and government-supported aviation sectors, these regions can appear to offer more attractive financial packages for MRO services when compared to Western Europe, even if the geographical distance and logistical challenges negate much of these savings for airlines operating predominantly within Europe.

What are the advantages of using Western European base maintenance providers?

As we have touched on above, Westen European MRO providers are both highly skilled and also very experienced. Western Europe has a long-established reputation for quality and precision in aviation maintenance. The region's facilities are manned by highly trained personnel with extensive experience in handling complex maintenance tasks for a wide variety of aircraft models. In addition, for Western European carriers, and those who operate across many Westen European routes, the region's dense network of major airports and airline hubs makes it an ideal location for base maintenance. Proximity reduces

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logistics' costs and turnaround times, and this advantage is particularly relevant for labour-intensive repairs that require rapid mobilisation of skilled teams.

Beyond the above, Western European MRO operators are often found at the cutting edge of new technologies, equipment and working practices. For example, we have the recent introduction of predictive maintenance tools, digital twins, and expanded automation, which are able to enhance operational efficiency and reduce long-term costs. However, while these innovations may help to reduce labour costs, they often still require a highly skilled workforce to implement and manage them.

How to remain competitive

While there is certainly no room for complacency, Western European MRO operators have two major advantages over their rivals in other regions – experience and a long-established reputation for highly qualified engineers who work to very high standards. The result? An MRO sector which is underpinned by quality and reliability. However, as is commonly accepted in business today, standing still means you are actually going backwards when compared to your competitors. So, how can the Western European MRO operator remain competitive?

As we have discussed above, embracing advanced technologies can reduce reliance on manual labour and streamline operations, lowering overall costs. In addition, automated inspections and predictive analytics can help to alleviate some of the labour-intensive tasks, consequently making operations more efficient. Beyond this, there are also opportunities to collaborate with other MRO providers, airlines, and OEMs in order to create economies of scale and share resources, thus reducing individual cost burdens. Then we have the option of implementing flexible labour practices, such as seasonal staffing or outsourcing non-core tasks, as this has the potential to more effectively manage labour costs. In addition to this, investing in cross-training for employees can improve labour efficiency by giving workers the skills to perform multiple roles.

And, of course, we have the challenge of trying to harness government support, either through lobbying for favourable tax policies, subsidies, or grants for the aviation sector which could alleviate some of the financial pressures on MRO providers in Western Europe or embracing government incentives for training programmes which could also help reduce the long-term costs associated with maintaining a highly skilled workforce.

In conclusion

While aircraft base maintenance in Western Europe is often perceived as costlier compared to other regions, it still remains highly competitive in terms of quality, expertise, and strategic advantages. The labour-intensive nature of base maintenance is a significant cost driver, but it is also a testament to the high standards of safety and precision upheld in the region. Additionally, airlines and MRO providers operating in Western Europe can enhance cost efficiency by leveraging technological innovations, strategic collaborations, and optimised operational practices. As for carriers prioritising safety, reliability, and turnaround time, Western Europe continues to offer a compelling value proposition despite its higher cost base.

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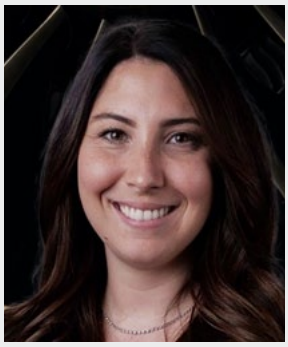

Blaire Shoor

GE Aerospace has announced the appointment of **Blaire Shoor** as Head of Investor Relations. In this role, Shoor will oversee the communication of GE Aerospace's vision to its shareholders and the financial community. Shoor brings over a decade of experience at GE Aerospace to this pivotal position. **Rahul Ghai**, Chief Financial Officer at GE Aerospace, stated: "Maintaining a trusted relationship with our analysts and shareholders is a top priority. Blaire's deep expertise and transparent style make her the ideal choice for this important role." Shoor joined GE Aerospace through the Financial Management Programme, progressing rapidly through the company's professional development initiatives. In 2019, she became part of the Financial Planning & Analysis team and in 2021, she joined the GE Corporate Investor Relations team, where she played a critical role in GE's transformation into three public companies. Shoor holds degrees in Finance and Information Systems & Operations Management from the University of Florida. GE Aerospace is a global powerhouse in aerospace propulsion, services, and systems, with an installed base of approximately 44,000 commercial and 26,000 military aircraft engines. Supported by a worldwide team of 52,000 employees and a legacy of over a century of innovation, GE Aerospace is dedicated to shaping the future of flight, lifting people up, and ensuring their safe return home.

Mike Heaton

DASI LLC, a provider of aircraft inventory solutions, has announced the appointment of **Mike Heaton** as president of the company. Heaton joins DASI from Satair, where he served as Managing Director, Americas, overseeing operations across four regional sites. With his extensive leadership expertise and proven track record, Heaton's appointment aligns with DASI's ongoing strategy to scale operations and address the increasing demands of the market. Rhod Gibson, the current president of DASI will transition to the role of co-CEO, ensuring continuity in leadership while contributing to the company's future growth strategies. DASI has achieved an impressive compound annual growth rate of 25% since 2020, fuelled by significant advancements in its surplus parts solutions, strategic partnerships with OEM and distributor channels and its expansion into engine sales and leasing. As DASI continues its remarkable growth trajectory, Heaton will play a pivotal role in fostering innovation, ensuring operational excellence, and enhancing customer satisfaction. He will also oversee daily operations, lead the company's expansion efforts and spearhead strategic initiatives to secure sustainable long-term success. Bringing over 30 years of international experience in the aerospace aftermarket materials services sector, Heaton's leadership credentials include senior roles at Airbus and, most recently, Satair. His deep understanding of the challenges and opportunities within the aerospace aftermarket uniquely positions him to guide DASI into its next phase of growth and innovation. The company is committed to strengthening its market position, leveraging its partnership with equity partner Marubeni Corporation and increased financial capacity. Under Heaton's leadership, DASI is well-positioned for continued success.

Karl Fitzgibbon (l) and Lee Carey (r)

EirTrade Aviation, the global aviation asset trading and material management firm headquartered in Dublin, has announced the promotion of **Lee Carey** to Chief Investment Officer and **Karl Fitzgibbon** to Chief Operating Officer. Both have demonstrated exceptional career progression during their nearly decade-long tenures at EirTrade, with their responsibilities expanding significantly over the years. Carey, who holds an MSc in Aviation Finance from UCD Michael Smurfit Graduate Business School

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and a BSc in Aviation Management from Dublin City University, joined EirTrade in 2016, initially focusing on sales and technical evaluations. Over time, he has taken on senior roles in sales and asset management, successfully overseeing the acquisition of more than 100 commercial aircraft and engines. Most recently, Carey served as Vice President of Origination and Trading at the company's Dublin headquarters. As Chief Investment Officer, his responsibilities will continue to include oversight of these activities, alongside a sharpened focus on building and strengthening relationships with investors and industry partners while forging new alliances. Fitzgibbon joined EirTrade in 2014 and has risen through the ranks, most recently serving as Vice President of Operations. In his new role, he oversees a dynamic operations and repairs team across Dublin and Dallas, while also managing logistics, customs, IT and facilities functions. With these strategic appointments, EirTrade Aviation reinforces its commitment to fostering talent and innovation within its leadership team, ensuring the company is well-positioned for continued growth and success in the competitive global aviation market.

Paul Kent

Aircraft lessor BOC Aviation has announced an expansion of **Paul Kent's** responsibilities as Chief Commercial Officer, effective today, January 13, 2025. Previously overseeing airline leasing and sales in Europe, the Americas, and Africa, Kent's role now extends globally, incorporating the Asia-Pacific and Middle East regions into his portfolio. Kent joined BOC Aviation in June 2020 as Chief Commercial Officer for Europe, the Americas, and Africa. With 29 years of experience in aircraft leasing and finance, his career includes roles at Citibank and leadership positions at aviation companies Doric and Amedeo. At Amedeo, Kent co-led the company's establishment, managing aircraft leasing and sales, capital raising, investments, and OEM relationships. Based in London, Kent will now lead BOC Aviation's global airline leasing and sales operations, consolidating regional responsibilities under a single leadership structure to drive further growth and efficiency.

Mike Cazaz (l) and Toshinori (Tony) Kondo (r)

Werner Aero has announced the retirement of its founder, president, and CEO, **Mike Cazaz**. After an illustrious 32-year career leading the company, Cazaz stepped down at the end of December 2024. Since founding Werner Aero, Cazaz had been instrumental in transforming the company into a globally recognised brand in the aviation industry. Renowned for its dedication to quality, innovation, and customer service, Werner Aero has become a trusted partner for airlines, maintenance, repair and overhaul (MRO) organisations, and leasing companies worldwide. Effective January 1, 2025, **Toshinori (Tony) Kondo**, the current Executive Vice President, will succeed Cazaz as CEO. Kondo brings a wealth of aviation expertise and a strong record of leadership to guide the company into its next phase of growth and development. Reflecting on his tenure, Cazaz remarked, "I am incredibly proud of what we have achieved at Werner Aero over the past three decades. This has been an extraordinary journey, and I am deeply grateful to our dedicated team, loyal customers, and partners for their unwavering support. I have complete confidence in Tony's leadership and the bright future that lies ahead for Werner Aero." Kondo shared his enthusiasm for his upcoming role, stating, "I am honoured to build upon Mike's legacy and lead this exceptional organisation. Together with our talented team, we will continue to deliver the highest standards of service and innovation to meet the evolving demands of the aviation industry."

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